

## **Residential Radon and Risk of Lung Cancer - A Combined Analysis of 7 North American Case-Control Studies**

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**Background:** Underground miners exposed to high levels of radon have an excess risk of lung cancer. Residential exposure to radon is at much lower levels, and the risk of lung cancer with residential exposure is less clear. We conducted a systematic analysis of pooled data from all North American residential radon studies.

**Methods:** The pooling project included original data from 7 North American case– control studies, all of which used long-term-track detectors to assess residential radon concentrations. A total of 3662 cases and 4966 controls were retained for the analysis. We used conditional likelihood regression to estimate the excess risk of lung cancer.

**Results:** Odds ratios (ORs) for lung cancer increased with residential radon concentration. The estimated OR after exposure to radon at a concentration of 100 Bq/m<sup>3</sup> in the exposure time window 5 to 30 years before the index date was 1.11 (95% confidence interval 1.00–1.28). This estimate is compatible with the estimate of 1.12 (1.02–1.25) predicted by downward extrapolation of the miner data. There was no evidence of heterogeneity of radon effects across studies. There was no apparent heterogeneity in the association by sex, educational level, type of respondent (proxy or self), or cigarette smoking, although there was some evidence of a decreasing radon-associated lung cancer risk with age. Analyses restricted to subsets of the data with presumed more accurate radon dosimetry resulted in increased estimates of risk.

**Conclusions:** These results provide direct evidence of an association between residential radon and lung cancer risk, a finding predicted using miner data and consistent with results from animal and in vitro studies.